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predetermined distance, said refractory conductive material being simultaneously deposited in said small-diameter contact hole and said large-diameter contact hole, a wiring conductor layer being deposited on said insulator film to cover a top surface of said plug of said refractory conductive material, and to fill at least in part space remaining in said large-diameter contact hole thereby to cover a bottom of said large-diameter contact hole and said refractory conductive material within said large-diameter contact hole.

REMARKS

Applicant's claims have been amended to better clarify Applicants' claimed invention. Claim 1, as amended herein, recites a semiconductor device which includes a large-diameter contact hole having an aspect ratio of not greater than 2 and a small-diameter contact hole having an aspect ratio of greater than 2. Support can be found in the Specification at page 6/1. 8-10.

No new matter has been entered. Reexamination and reconsideration of the application, as amended, is respectfully requested.

Claims 1-4, 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited Tsoi et al. (U.S. Pat. No. 5,631,484) in view of Roberts et al. (U.S. Pat. No. 5,730,835) and Miller et al. (5,714,804).

Claims 1-4, 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited Tsoi et al. (U.S. Pat. No. 5,631,484) in view of McDavid. (U.S. Pat. No. 4,507,853) and Miller et al. (5,714,804).

Claims 5, 6, 9 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited Tsoi et al. (U.S. Pat. No. 5,631,484), McDavid. (U.S. Pat. No. 4,507,853) and Roberts

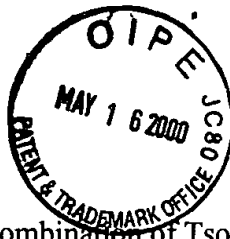
et al. (U.S. Pat. No. 5,730,835) in view of Miller et al. (5,714,804).

In the Office Action dated February 8, 2000, the Examiner relies on newly cited Tsoi et al. as teaching: "Tsoi et al. show (see Figure 11 and column 2, line 1 et seq.) a structure with different sized vias 66, 67 for contacting different portions of the device . . ." See, February 8, 2000 Office Action at Page 2, Paragraph 4 (emphasis added). However, the Examiner appears to acknowledge, Tsoi et al. contains no teachings or suggestions whatsoever regarding contact holes having differing aspect ratios which contact the same portions of the device, i.e. the same conductive layer. Rather, in Tsoi et al the contact holes 66 and 67 in FIG. 11 contact different layers. Contact hole 66 extends through dielectric layer 37, layer 34, and layer 29, to expose layer 121. On the other hand, contact hole 67 extends through dielectric layer 37 to expose layer 34.

In addition, Tsoi et al. nowhere teaches that contact hole 66 and contact hole 67 have differing aspect ratios. Quite to the contrary, while contact hole 66 appears to be wider than hole 67, hole 66 is clearly deeper than hole 67. See, FIG. 11. Therefore, the aspect ratios of holes 66 and 67 appear to be similar if not identical.

Moreover, Tsoi et al. fails to teach or suggest use of a large-diameter hole, i.e. a contact hole having an aspect ratio less than 2, which is only partially filled with a refractory conductive material. Quite to the contrary, Tsoi et al. teaches complete filling of all the contact holes with a non-refractory material, i.e. "an aluminum-silicon alloy." Col. 6/l. 3-6. FIG. 12 clearly shows that the larger diameter contact hole is completely filled with ohmic material 71.

As discussed at length in Applicants' previously filed Appeal Brief, which is incorporated herein by reference, neither Roberts et al., nor McDavid et al., nor Miller et al. teach a device having both contact holes having an aspect ratio less than 2 and contact holes having an aspect



ratio greater than 2. Thus no combination of Tsoi et al, Roberts et al., and Miller et al., or Tsoi et al, McDonald and Miller et al, or Tsoi et al, McDonald and Roberts et al reasonably can be said to teach or suggest use of contact holes which contact the same conductive layer, wherein certain of those contact holes have an aspect ratio less than 2 and other contact holes have an aspect ratio greater than 2, and wherein the low aspect ratio contact holes are only partially filled with refractory conductive material, as required by claim 1, as amended.

Having dealt with all of the outstanding rejections of the claims, Applicant submits that the application is in condition for allowance, and an allowance at an early date is respectfully solicited.

In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account No. 08-1391.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231 on May 8, 2000, at Manchester, New Hampshire.

By Kristine Stevens

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